Fuels Workshop on Regulatory and Non-Regulatory Fuels Activities for 2005

May 24, 2006

California Environmental Protection Agency

Air Resources Board

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Agenda

- Introductions
- Diesel
  - Low-Sulfur Implementation
  - AB 679
- Alternative Fuels
  - E85 Program
  - Suggested Biodiesel Policy

Agenda
(Continued)

- ☞ Gasoline
  - – Proposals for Flexibility, Enforceability, and Consistency
  - – California Predictive Model
    - New Data Sets
    - Statistical Subgroup
    - CO
    - Reactivity
    - Emissions Inventory
    - Permeation
    - High Emitters
- ☞ Presentations by Others
- ☞ Open Discussions
- ☞ Closing Remarks

Discussion Topic: Diesel

Implementation of Low-Sulfur Diesel Fuel Regulations

☞ Low-Sulfur regulation approved by Board in 2003

☞ Implemented in 2004

☞ Requires 15 ppmw sulfur limit on California motor vehicle diesel fuel

– June 1, 2006 – Refinery

– 45 days later – Terminals

– 45 days later – Retail Outlets

Implementation of Low-Sulfur Diesel Fuel Regulations

☞ ARB staff, in conjunction with the CEC, is surveying the industry regarding the implementation

☞ So far, all California refiners appear to be on schedule and are expected to meet the June 1, 2006 limit of 15 ppmw

Diesel - Conductivity

- ☞ Issues brought up regarding fuel conductivity
- ☞ Staff is surveying the industry for practices
- ☞ Low-sulfur diesel been used fleets for several years

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Assembly Bill 679

- The bill requires the state board to convene a panel of interested parties to develop a test protocol for the evaluation of California diesel fuel, and to recommend to the executive officer of the state board a subsequent test program that measures the emissions benefits of California diesel fuel.

- The bill would also require the state board, no later than December 31, 2007, to complete the test program and to submit the results of the test program to the Legislature.

- BioDiesel Research Program ??

Discussion Topic: Alternative Fuels

E85 Demonstration Program

- ☞ AB 1007 requires the development of recommendations for a state plan to increase the use of alternative transportation fuels.
  - Assigns lead responsibility for developing the recommendations to the California Energy Commission in consultation with the Air Resources Board
  - Requires the plan to be developed and adopted not later than June 30, 2007.

E85 Demonstration Program

☞ State entered into agreement with GM, Chevron (CTV), and Pacific Ethanol to learn more about consumer awareness and acceptance of E85 as a motor vehicle fuel.

☞ FFVs, 50 to 100, in CalTrans fleet will use E85 at various locations for about 1 year.

  – Oakland and Marysville

☞ Vehicles delivered

☞ Evaluate need to update specifications

SUGGESTED ARB BIODIESEL POLICY SUMMARY

Suggested ARB Policy would:

- Consider B20 and below as California diesel fuel
- Allow use with verified technologies
- Not address potential NOx increase
- Not address higher blends of biodiesel

SUGGESTED ARB BIODIESEL POLICY

☞ Biodiesel blends can be used in on- and off-road diesel vehicles and engines under the following conditions:

– Biodiesel portion of the blend meets the ASTM 6751 (15 ppm sulfur)

– Diesel fuel portion of the blend complies with CARB diesel fuel regulations

– Resulting mix contains no more than 20% biodiesel by volume

SUGGESTED ARB BIODIESEL POLICY (Contd)

☞ Vehicles using CARB verified retrofit devices can use biodiesel blends up to 20%

– Verification based on CARB diesel

☞ Users of biodiesel blends should determine if use of the desired biodiesel blend will affect their emission control or engine warranty

– Advised to avoid use of fuel that would negate a warranty

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SUGGESTED ARB BIODIESEL POLICY (Contd)

☞ Biodiesel blends generally reduce diesel PM and organic compounds; NOx emissions may increase

- Effects increase as the percent of biodiesel in the fuel increases

- Blends of no more than B20 could expand use of an alternative, renewable fuel while preserving vehicle emission performance

- Widespread use of biodiesel may require ARB to set specifications to ensure CARB diesel emissions benefits

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SUGGESTED ARB BIODIESEL POLICY (Contd)

☞ B100 (100% biodiesel) or blends ≥ 50 percent are currently exempt from ARB's diesel regulations

☞ Biodiesel blends > 20 percent and < 50 percent biodiesel are not prohibited by ARB regulations; but are not recommended at this time.

Biodiesel

- Initiate biodiesel research to study the impacts of biodiesel use in California
  - Emissions impact
  - Lifecycle assessment
- Governor's EO S-06-06 sets California biofuels production targets
  - 20 percent 2010
  - 40 percent 2020
  - 75 percent 2050

Liquid Petroleum Gas (LPG)

☞LPG sampling study to determine the levels of residuals in the LPG production, storage, and distribution system.

☞Solicit participation and input from LPG stakeholders

– Sampling procedure

– Sample analysis

– Sampling protocol

Discussion Topic: Gasoline

Proposal for Flexibility, Enforceability, and Consistency

Predictive Model

- Committed to the Board to review need for update about every 5 years – last updated 1999

- Issues

  - Permeation

  - Carbon Monoxide

  - New Data

  - Emissions Inventory Model – EMFAC

- Present Proposal for new model to Board in 2006

Predictive Model
New Datasets

- New Datasets
  - AAM/AIAM/Oil Industry Low Sulfur and Oxygenate Test Program
  - Exxon Mobile
  - CRC E-60
  - CRC E-67
  - Toyota
  - Mexico ???
- All data released through Fuels webpage

Updated CaRFG Predictive Model Database Summary

Description / Study	# Studies	# Obs	# Vehs	# Fuels
Current Database (1999)	37	9,443	1,306	309
AAMSUOXY	1	323	13	6
TOYOTA	1	33	9	2
CRC_E60	1	201	14	3
CRC_E67	1	326	12	12
EXXONMOBIL	1	42	5	4
TOTAL	**42**	**10,368**	**1,359**	**336**

Hydrocarbon Model

☞ Four Parts

- – Exhaust HC% * IWF * RF +
- – Evap HC% * IWF * RF +
- – CO% * IWF *RF +
- – Permeation% * IWF * RF

☞ Evap - Hot Soak, Diurnal, Resting Loss, and Running Loss

Statistical Subgroup

- Three Conference Calls - Weekly meetings?
- Working on:
  - Transformations - Log Transform too severe?
  - Repeated Measures vs Complete Randomization
  - Partitioning of the Tech 4 Dataset
- Will refine concepts and consult where differences continue
- Will investigate standalone opportunity for Tech 5 Model
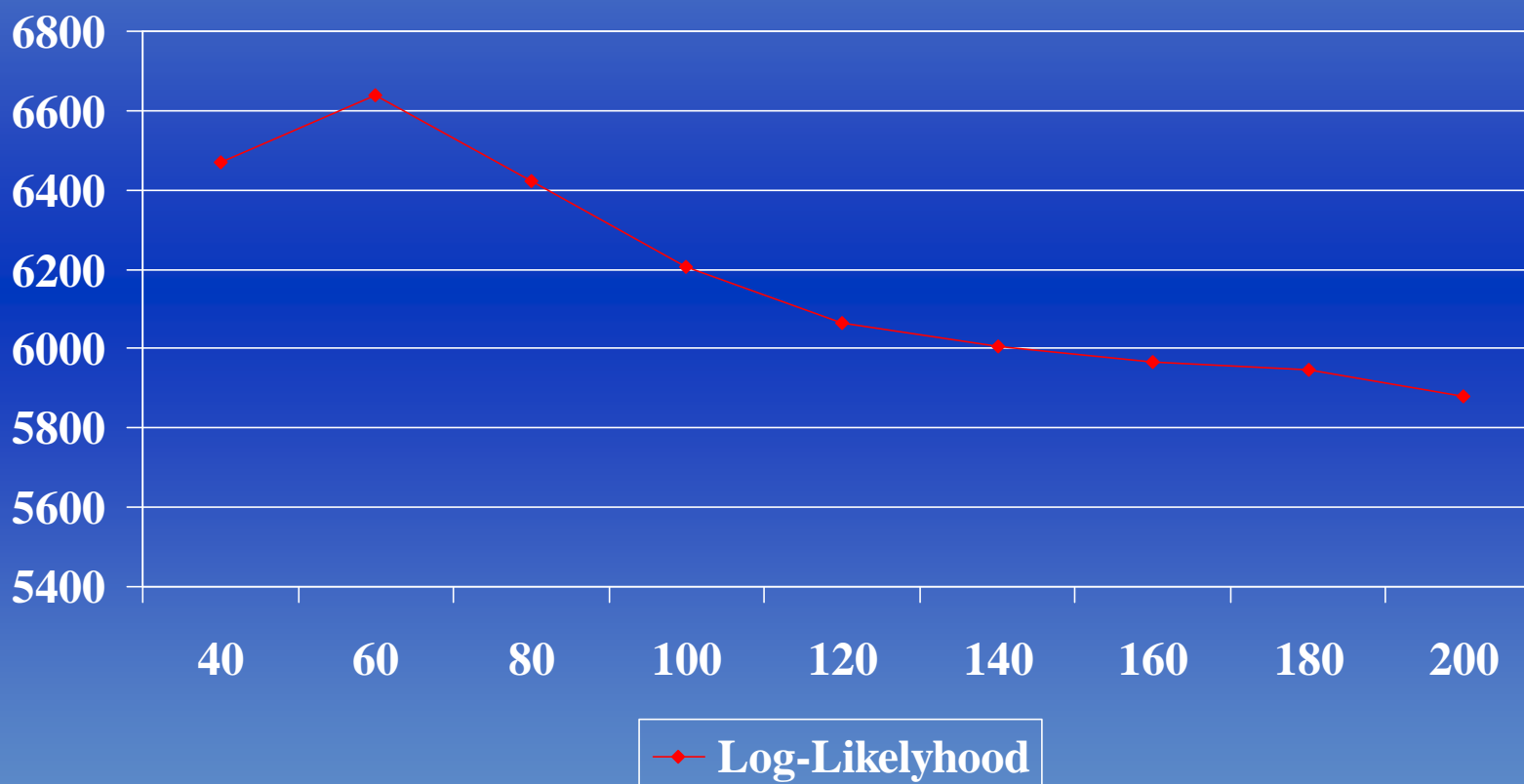
Statistical Subgroup

☞ Must consult with automobile manufacturers about why best fit is about .5 to.6 of standard

☞ Vehicle responses versus sparse data effect?

Carbon Monoxide

2003 Update to MIR Values

☞ 23 existing VOCs for which new MIR values differed by 5% or greater

☞ 102 new VOCs added to the list

☞ Handouts provide information on new 102 VOCs and 23 existing VOCs

Reactivity and CRC E-67 Study

☞ CRC Project E-65, developed permeation species profiles for MTBE, Ethanol, and, Non-Oxy Fuel for each of 10 Vehicles in test program

☞ Using the new MIR values for permeation provided a maximum of ~ 0.2% change in composite MIR for any given vehicle/fuel combination

Permeation Test Program

- In 2002, the CRC and ARB co-funded permeation study

- Results:
  - Ethanol fuel higher than MTBE on all vehicles and higher than non-oxy on almost all vehicles
  - 65% or 1.4 grams/day more than MTBE gasoline
  - 45% or 1.1 grams/day more than non-oxygenated gasoline

- ARB Emissions Inventory group working on using data to estimate emissions

Permeation - What's Next

- The CRC is proceeding with a second stage of the test program

- Two additional vehicles: LEV II and PZEV

- Two additional fuels: 10% ethanol and a higher aromatics fuel

- E-85 will also be tested on an flexible fueled vehicle

- E20 has been added to fuels matrix

- Interim Final Report available soon?

Emissions Inventory

☞ EMFAC being updated for next rounds of SIPs

☞ New vehicle populations

☞ New temperature profiles

☞ New activity information from COGs

☞ Incorporating permeation information

☞ Final version available late 2006

☞ Conformity Issues

High Emitters

Test Methods

Presentations by Others

Open Discussions

Closing Remarks